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Clinico-Epidemiological Study of Allergic Fungal Rhinosinusitis & its Management Outcomes

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ABSTRACT

Background: Allergic Fungal Rhinosinusitis (AFRS) is a non-invasive form of chronic rhinosinusitis characterised by an allergic response to fungal elements, commonly affecting young immunocompetent individuals and associated with high recurrence rates.
Aim: To study the clinico-epidemiological profile of AFRS and evaluate management outcomes in a tertiary care setting.
Materials and Methods: This prospective observational study was conducted over one year (September 2023–August 2024) at Sardar Vallabhbhai Patel Institute of Medical Sciences & Research (SVPIMSR), Ahmedabad. A total of 50 patients diagnosed with AFRS were included based on clinical, radiological, and histopathological criteria. Detailed history, diagnostic nasal endoscopy, CT scan of paranasal sinuses, and laboratory investigations were performed. All patients underwent Functional Endoscopic Sinus Surgery (FESS) followed by medical therapy. Patients were followed up to assess symptomatic improvement, endoscopic findings, and recurrence.
Results: The majority of patients were in the 21–30 years age group with slight male predominance. Nasal obstruction (92%) was the most common symptom. Unilateral involvement was seen in 68% of cases. CT findings showed hyperdense areas in 90% of patients. Associated allergic conditions were common. Post-treatment, 88% of patients showed significant symptomatic improvement, while recurrence was observed in 12% of cases.
Conclusion: AFRS commonly affects young adults and presents with characteristic clinical and radiological features. Combined surgical and medical management yields favourable outcomes with low recurrence when supported by regular follow-up and compliance with therapy.

Keywords*: Allergic Fungal Rhinosinusitis; Chronic Rhinosinusitis; Nasal Polyposis; Functional Endoscopic Sinus Surgery (FESS); Allergic Mucin; Computed Tomography; Recurrence; Sinonasal Disease; Fungal Sinusitis; Corticosteroids.*

INTRODUCTION

Allergic Fungal Rhinosinusitis (AFRS) is a well-recognised subtype of chronic rhinosinusitis characterised by a non-invasive hypersensitivity reaction to fungal elements within the sinonasal cavities. It typically affects immunocompetent individuals and is associated with nasal polyposis, thick eosinophilic mucin, and characteristic radiological findings. AFRS has gained increasing clinical importance due to its chronic course, high recurrence rate, and potential for significant morbidity if not appropriately managed [1].

The condition was first systematically described in 1981, highlighting the presence of allergic mucin containing fungal hyphae without tissue invasion [2]. Subsequent studies established specific diagnostic criteria, which include type I hypersensitivity, nasal polyposis, characteristic computed tomography (CT) findings, eosinophilic mucin without invasion, and positive fungal staining [3]. These criteria have been widely accepted and continue to guide clinical diagnosis.

AFRS accounts for approximately 5–10% of patients undergoing surgery for chronic rhinosinusitis, with a higher prevalence in warm, humid climates such as India [4]. Environmental exposure to fungal spores, particularly species like *Aspergillus* and *Bipolaris*, along with host immunological factors, plays a crucial role in disease pathogenesis [5]. The disease commonly affects adolescents and young adults and may be associated with atopic conditions such as allergic rhinitis and asthma [6].

Clinically, patients present with nasal obstruction, nasal discharge, anosmia, facial pain, and headache. In advanced cases, the disease may lead to expansion of sinuses, bone erosion, and rarely, orbital or intracranial complications [7]. Radiologically, CT imaging demonstrates heterogeneous hyperdense areas, sinus expansion, and bony remodelling, which are considered hallmark features of AFRS [8].

Management of AFRS requires a combined approach involving surgical and medical therapy. Functional Endoscopic Sinus Surgery (FESS) is the mainstay of treatment, aimed at complete clearance of allergic mucin and restoration of sinus drainage [9]. Postoperative medical therapy, particularly corticosteroids, plays a crucial role in controlling inflammation and preventing recurrence [10]. Despite advances in treatment, AFRS remains a challenging condition due to its recurrent nature.

The present study was undertaken to evaluate the clinico-epidemiological profile of AFRS and to assess the outcomes of its management in a tertiary care centre.

MATERIALS AND METHODS

Study Design and Setting

This was a prospective, observational clinico-epidemiological study conducted in the Department of Otorhinolaryngology at Sardar Vallabhbhai Patel Institute of Medical Sciences & Research (SVPIMSR), Ahmedabad, Gujarat, India.

Study Duration

The study was carried out over a period of 1 year, from September 2023 to August 2024.

Study Population and Sample Size

A total of 50 patients diagnosed with Allergic Fungal Rhinosinusitis (AFRS) were included in the study. Patients presenting to the ENT outpatient department and those admitted for management during the study period were evaluated.

Inclusion Criteria

- Patients of all age groups and either gender
- Patients clinically suspected and radiologically suggestive of AFRS
- Patients fulfilling diagnostic criteria for AFRS (including nasal polyposis, characteristic radiological findings, and allergic mucin with fungal elements)
- Patients willing to participate and provide informed consent

Exclusion Criteria

- Patients with invasive fungal sinusitis
- Patients with immunocompromised status (e.g., uncontrolled diabetes, HIV/AIDS, malignancy, chemotherapy)
- Patients with previous sinonasal malignancy
- Patients not willing to participate in the study

Data Collection

Detailed clinical history was obtained from all patients, including demographic data (age, gender, residence), presenting symptoms (nasal obstruction, nasal discharge, headache, anosmia, facial pain), duration of illness, history of allergy, asthma, and previous treatment. A thorough general and ENT examination was performed.

Diagnostic Evaluation

All patients underwent:

- Diagnostic nasal endoscopy to assess the nasal cavity and the presence of polyps, allergic mucin, and anatomical variations
- Radiological evaluation using computed tomography (CT) scan of paranasal sinuses to identify characteristic features such as hyperdense areas, sinus expansion, and bony erosion
- Laboratory investigations, including complete blood count, absolute eosinophil count, and serum IgE levels
- Microbiological and histopathological examination of surgical specimens for confirmation of fungal elements and allergic mucin

Management Protocol
All patients were managed with a combination of medical and surgical treatment.

- **Medical management** included preoperative and postoperative systemic and/or topical corticosteroids, antihistamines, and saline nasal irrigation
- **Surgical management** consisted of Functional Endoscopic Sinus Surgery (FESS) for the removal of allergic mucin, polyps, and clearance of affected sinuses

Outcome Measures
Patients were followed up postoperatively at regular intervals (2 weeks, 1 month, 3 months, and 6 months). Outcomes were assessed based on:

- Symptomatic improvement (relief in nasal obstruction, discharge, headache)
- Endoscopic findings (resolution or recurrence of polyps and mucin)
- Recurrence rate
- Complications, if any

Statistical Analysis
Data were entered into Microsoft Excel and analysed using appropriate statistical software. Descriptive statistics such as mean, standard deviation, frequency, and percentage were used. Association between variables was assessed using the chi-square test where applicable. A p-value of <0.05 was considered statistically significant.

Ethical Considerations
The study was conducted after obtaining approval from the Institutional Ethics Committee. Written informed consent was obtained from all participants before inclusion in the study. Confidentiality of patient data was maintained throughout the study.

RESULTS AND OBSERVATIONS
A total of 50 patients diagnosed with Allergic Fungal Rhinosinusitis (AFRS) were included in the study. The following observations were made:

Table 1: Age Distribution of Patients (n = 50)

Age Group (Years)	Number of Patients	Percentage (%)
<20	8	16%
21–30	18	36%
31–40	12	24%
41–50	7	14%
>50	5	10%

The majority of patients (36%) belonged to the 21–30 years age group, indicating a higher prevalence in young adults.

Table 2: Gender Distribution

Gender	Number of Patients	Percentage (%)
Male	28	56%
Female	22	44%

There was a slight male predominance with a male-to-female ratio of approximately 1.27:1.

Table 3: Presenting Symptoms

Symptom	Number of Patients	Percentage (%)
Nasal obstruction	46	92%
Nasal discharge	40	80%
Headache	32	64%
Anosmia	28	56%
Facial pain	20	40%

Nasal obstruction was the most common presenting complaint (92%), followed by nasal discharge (80%).

Table 4: Laterality of Disease

Laterality	Number of Patients	Percentage (%)
Unilateral	34	68%
Bilateral	16	32%

AFRS was predominantly unilateral (68%).

Table 5: Associated Allergic Conditions

Condition	Number of Patients	Percentage (%)
Allergic rhinitis	30	60%
Asthma	12	24%
None	8	16%

A significant proportion of patients (60%) had associated allergic rhinitis.

Table 6: CT Scan Findings

CT Finding	Number of Patients	Percentage (%)
Hyperdense areas	45	90%
Sinus expansion	30	60%
Bone erosion	18	36%
Multiple sinus involvement	38	76%

Hyperdense areas on CT scan were seen in 90% of cases, which is characteristic of AFRS.

Table 7: Treatment Modality

Treatment Type	Number of Patients	Percentage (%)
FESS + Medical therapy	50	100%
Medical therapy alone	0	0%

All patients underwent surgical management (FESS) along with adjunct medical therapy.

Table 8: Postoperative Outcomes

Outcome	Number of Patients	Percentage (%)
Symptomatic improvement	44	88%
Recurrence	6	12%
Complications	4	8%

The majority of patients (88%) showed significant symptomatic improvement. Recurrence was noted in 12% of cases.

Table 9: Endoscopic Follow-up Findings

Finding	Number of Patients	Percentage (%)
No disease	40	80%
Residual/recurrent polyp	10	20%

On follow-up, 80% of patients had no evidence of disease, while 20% showed recurrence or residual disease.

DISCUSSION

The present study evaluated the clinical profile and management outcomes of patients with Allergic Fungal Rhinosinusitis (AFRS), highlighting patterns consistent with existing literature while also reflecting regional characteristics. AFRS remains an important subset of chronic rhinosinusitis due to its distinct pathophysiology and recurrent nature.

The age distribution in this study showed a higher prevalence among young adults, particularly in the second and third decades of life. This observation is consistent with previous studies, which suggest that AFRS predominantly affects immunocompetent individuals in younger age groups [11]. The slight male predominance observed aligns with some reports, although gender distribution varies across populations and studies.

Nasal obstruction was the most common presenting symptom, followed by nasal discharge and headache. These findings are in agreement with established literature, where nasal blockage is considered the cardinal symptom due to sinonasal polyposis and accumulation of allergic mucin [12]. The association of AFRS with allergic rhinitis and asthma observed in this study further supports the role of atopy and hypersensitivity in disease pathogenesis [13].

Radiologically, hyperdense areas within the sinuses were observed in the majority of patients, consistent with classical CT findings of AFRS. Sinus expansion and bony erosion were also noted in a significant proportion of cases, reflecting the expansile yet non-invasive nature of the disease [14]. These features are important in differentiating AFRS from other forms of chronic rhinosinusitis.

The predominance of unilateral disease in this study is similar to findings reported in earlier research, although bilateral involvement is also recognized [15]. The frequent involvement of multiple sinuses suggests that many patients present at an advanced stage, possibly due to delayed diagnosis or inadequate early treatment.

All patients in this study were managed with Functional Endoscopic Sinus Surgery (FESS) combined with medical therapy. Surgical intervention is essential for removal of allergic mucin and restoration of sinus ventilation, while postoperative corticosteroid therapy helps in controlling inflammation and preventing recurrence [16]. The high rate of symptomatic improvement observed in this study reflects the effectiveness of this combined approach.

The recurrence rate observed was relatively low compared to some previous studies, where recurrence rates have been reported to be significantly higher [17]. This may be attributed to meticulous surgical technique, appropriate postoperative care, and regular follow-up. Long-term management with topical steroids and endoscopic monitoring plays a crucial role in reducing recurrence.

Despite favourable outcomes, AFRS continues to present challenges due to its chronic and relapsing course. Factors such as environmental exposure, host immune response, and patient compliance significantly influence prognosis. A multidisciplinary approach involving otorhinolaryngologists, radiologists, and microbiologists is essential for optimal management.

The limitations of the present study include a relatively small sample size and a limited duration of follow-up. Further large-scale studies with long-term follow-up are needed to better understand recurrence patterns and to optimise management strategies.

CONCLUSION

Allergic Fungal Rhinosinusitis is a non-invasive, recurrent form of chronic rhinosinusitis commonly affecting young adults. Nasal obstruction and characteristic CT findings aid in diagnosis. Combined surgical (FESS) and medical therapy is effective, with good outcomes and low recurrence when followed by regular postoperative care. Long-term follow-up is essential for optimal disease control.

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